Illuminating Engineer

XVII. September, 1934 Price

THE JOURNAL OF GOOD LIGHTING

Mr. THERM's TRANSFORMATION SCENE

THESE two photographs show just how Chelsea Embankment looked before and after Mr. Therm had been busy putting in a new system of gas lighting.

The whole length of the Embankment is now lit by centrally hung lamps. There are thirty-nine of these lamps in all and every one is inspected every night at lighting-up time.

Gas used for public lighting during last year increased by 2.4% in the area of

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The ILLUMINATING ENGINEER

THE JOURNAL OF GOOD LIGHTING

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J. STEWART DOW

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Principal Contents:

Summer Lighting

TO Hear People Talk one might think that the Sun was an Enemy to the Lighting Industry—that when his rays gathered force in the Summer, all artificial lighting ceased and the lamp maker had better put up the shutters.

No Such Thing. The brilliant weather of this record summer has inclined people to spend their evenings out of doors, to make use of floodlighting to prolong by night the pleasure that the Sun has given them by day. There never was a season with a greater demand for out-of-door lighting at seaside resorts.

And as for indoor lighting, what better time could there be to put in hand remodelled lighting than the Summer, when business is less pressing—when indoor entertainments can be deferred and factories deranged with a minimum of ill effect?

Light is an essential Commodity. There is no "Close Time" for Lighting.

Illuminating Engineering Society

Opening Meeting

We learn that an attractive series of papers is in prospect for members of the Illuminating Engineering Society, and that the opening meeting has been provisionally fixed for Tuesday, October 9. At this meeting the new President (Mr. H. Hepworth Thompson) will present his address. The usual report of progress will be submitted, and there will be a display of exhibits illustrating progress in illuminating engineering. On such occasions, there is never any lack of interesting and novel exhibits, including new lamps and fittings, original illuminated signs, photometric devices, etc. Will any members or firms having novel items that might be shown at this meeting kindly communicate with the hon. secretary (Mr. J. S. Dow, 32, Victoria Street, London, S.W.1)? The display invariably attracts widespread attention, and affords an excellent opportunity of making new developments in the lighting field known.

Association of Public Lighting Engineers

Annual Conference and Exhibition

This is our last opportunity of reminding readers of this forthcoming Conference, which takes place in Aberdeen during September 17-20. We understand that an excellent attendance is already assured. Evidently the holding of the Conference in " the far North " is not going to act as a deterrent. We have, however, been asked to draw the attention of members and delegates specially to the Association supper and dance, an agreeable and informal event which is to take place on September 18. This item is arranged specially for the benefit of the ladies, who, it may be recalled, were officially invited to attend for the first time last year. May we therefore make a special appeal to members and delegates to support this function—the first of its kind that the Association has arranged—and to bring their womenfolk with them to Aberdeen?

Lectures on Illuminating Engineering

We not infrequently receive enquiries in regard to facilities for instruction in illuminating engineering, and we therefore gladly take the opportunity to draw attention to a special course that has been arranged at the Northampton Polytechnic Institute (St. John Street, London, E.C.1), under the supervision of Mr. H. S. Barlow. This is a continuous course, spread over two years. Lectures on Illumination and Laboratory Work will occupy 7 to 9.30 p.m. on Mondays during the first year, and Tuesdays and Fridays during the second year. (Associated with this course is a series of lectures on Mathematics on Wednesdays.) This evening course offers an excellent opportunity to young men who are engaged by day, but wish to get some knowledge of illuminating engineering during their leisure time.

30th E.L.M.A. Illumination Design Course

An interesting notice has come to hand of the Thirtieth Illuminating Design Course, to be held at the E.L.M.A. Lighting Service Bureau (2, Savoy Hill, London, W.C.2) during the autumn, which is open to all sections of the lighting industry. The series of six lectures takes place at 7.30 p.m. on successive Mondays, from October 15 onwards. The topics include the Potentialities of the Lighting Market, Illumination Design, Modern Electric Lamps, Lighting of Commercial Buildings, Flood Lighting, and Light Design in Architecture. The enterprising step of arranging for someone well known in the lighting industry to open the discussion at each meeting has again been followed. Those who take part in the course cannot fail to pick up much useful information—and, incidentally, will have an opportunity of inspecting the new Architectural Room and Lecture Theatre, now in course of reconstruction.

The facilities available for demonstrations at the Bureau are unique. The course is undoubtedly a most useful one to those who intend to specialise in electric lighting, and such as cannot be obtained elsewhere in this country.

Recent Progress in Illuminating Engineering in the United States*

By Samuel G. Hibben, B.Sc., E.E.

(Director of Lighting for the Westinghouse Lamp Company, New York City.)

MR. PRESIDENT, ladies and gentlemen, fellow-members of the Illuminating Engineering Society.

I feel greatly honoured to have the opportunity of giving this address, containing an informal account of some recent developments, or rather trends, in illumination in the United States. Cordial greetings come from the American I.E.S., and I bear good wishes for the further success of your Society.

I hope that my efforts in this direction will lead to reciprocal activities, and that we in the United States may have frequent opportunities of listening to accounts of your doings, and of repaying, in small portion at least, the hospitality which I have so much enjoyed. For my part, I have already learned much during my brief stay in Europe on this occasion, and I am quite sure that much good would result from an interchange of speakers in the manner suggested. On both sides of the Atlantic our aims are similar. Let not geographical distance keep our minds and aspirations separated!

Mr. Samuel G. Hibben.

Turning, therefore, to the subject of my lecture, I may explain that it is especially during the last few years that we have felt, in the United States, that lighting was really coming into its own. Our work has, of course, been basically scientific in so far as it is concerned with the development of new methods and new appliances, and bits of it are properly theoretical. But it is also largely practical, in that we are faced by the task of conveying our knowledge in simple terms to something like twenty-two millions of residential customers, or, more broadly, to more than one hundred and thirty million actual users of artificial light.

Perhaps we have learned well, but taught poorly. Yet the foundation of lighting practice is well laid! Hence we see a tendency towards two modes of expression—the more technical phraseology which we use amongst ourselves as technicians, and the more homely way of expressing what is addressed to the public. Actually achieving better lighting has lagged far behind the knowledge of what the improvement should be. Thus we find in the forefront the work of demonstrating by exhibitions or trial installations; by lighting institutes; by schools; by pictures; by practical examples; by house-to-house calls.

SHARING KNOWLEDGE WITH THE CONSUMER.

There are two hundred or more lighting service bureaus, chiefly identified with the electric lighting companies, distributed throughout North America, each employing from one to thirty lighting service men and women, whose task it is to impress upon the public the importance of good lighting. We are coming to feel more and more that it is a mistake to, in a measure, " segregate " ourselves by keeping our knowledge away from consumers, and that it is much better that they should fully share our appreciation of what constitutes good lighting, and all of the reasons therefor. In fact, many an average consumer or citizen should enjoy and profit by I.E.S. affiliations, because such are sources of really " usable " facts.

Our Societies are destined to continue because of opportunities that membership develops to pursue " careers of self-education "—as stated by one of your own past-presidents. Next comes the duty of spreading the gospel. We must, however, convey our knowledge by simple illustrations. We tend more and more to go back to fundamentals and to place less emphasis on efforts to instruct the public in the use of such limited terms as " intrinsic brightness," " isolux graphs," " cosine-laws," " inverse square relations,"—even " lux and lumens and lamberts "! We are ceasing even to grade the scales of instruments for measuring light in terms of " foot-candles." It is becoming usual instead merely to indicate divisions corresponding to certain grades of usage, e.g., for safety, rough work, and for fine work, etc. When the pointer reaches one of these sections the consumer knows that the illumination corresponding to that needed has been furnished.

Neither do I feel that it is now wise to set forth such narrowly limited intensity values for the various classes of man's work of seeing. Much rather would I preach that in some cases 50 foot-candles

* Delivered at the meeting of the Illuminated Engineering Society held in the Lecture Theatre of the Institution of Mechanical Engineers, London, on Tuesday, May 8, 1934.

were good and 10 were inadequate, than to say "use 3." or "this service needs 4.5." Our concepts of intensities need revision. Emphasis on the "science of seeing" is sure to lead to the upward movement, and to less dogmatic tabulations.

Perhaps it is now more than 300,000 years since men began to have some knowledge of sources of light. Little beyond 3,000 years behind us can we find reasonably portable lighting lamps. Slightly over 300 years ago the tallow candle illuminated the palaces of your kings, or the ships bearing my ancestors from Plymouth, England, to Plymouth, Massachusetts. In all those generations man has seen but poorly! It is, however, only thirty years ago that really efficient electric sources of light (metallic filament lamps) made their appearance and, as you know, it is only two or three years since the most efficient sources of all, gaseous or vapour discharge lamps were introduced. How abruptly the curve of progress rises in modern times!

THE SCIENCE OF VISION.

We are conscious, too, that the time available for each individual's work in this field is all too small. Of a normal seventy-year span of life, sleep consumes quite twenty-five. Possibly an additional thirty years is occupied in eating, reading, and in recreation. There remains, therefore, only some fifteen years of life for actual work—and the tempo of this work makes an ever-increasing demand upon our eyes. Without the *best* light we can scarcely accumulate enough wealth in these few working years in order to enjoy restful sleep or have the wherewithal for recreation. Hence the dawning recognition in America of the great importance of the science of vision, and of the need to provide not merely a niggardly "sufficient," but rather a generous illumination for the benefit of the eyes and of the race.

It may certainly be said that at an illumination of only 3 to 5 foot-candles "seeing" ordinarily is possible. An increase of 40 to 50 foot-candles brings with it much greater ease of vision and improvement in visual acuity. Yet, even so, we must recognise that we are far from the level of 5,000 foot-candles corresponding to full diffused daylight. How much physical energy do we lose through our unwillingness to raise our artificial illumination to this level? Somewhere between the antique minimum of, say, 2 foot-candles and this upper limit of 5,000 foot-candles there must exist a value which it is desirable and reasonable for us to try to maintain. If our artificial lighting were expressed in fractions of sunlight intensities, we might be impressed with our shortcomings.

It may be of interest in this connection to recall the belief of scientists that our means of acquiring knowledge are distributed roughly in the manner shown in the following table.

MEANS OF ACQUIRING KNOWLEDGE:—

Touch	1.5	per cent.
Taste	1.0	„ „
Smell	3.5	„ „
Hearing	7.0	„ „
Seeing	87.0	„ „

The eye thus does far more than any other organ towards acquiring knowledge. Its abilities in this respect are well illustrated in the Chinese proverb, "A picture is worth 10,000 words."

QUALITY AND QUANTITY.

We have, however, recently come to realise more acutely the importance of *quality* as well as *quantity* in connection with light production and application. One is familiar with specifications in which lighting conditions are defined numerically—for example, in terms of so many foot-candles or of so many watts per square foot. But what instrument is there available which will indicate *quality* of an installation? In the United States accordingly more attention is being devoted to such matters as colour and the direction from which light is received. We realise that basically utilitarian illuminations of 10 foot-candles, and even 25 to 50 foot-candles, may be only a beginning. We are already beginning to learn and think of seasonal colours; of changeable systems; of 20 kw connected load per residence; and 150 lighting outlets; of superimposing the *joy* of lighting upon the bare *needs* of lighting.

Having thus reviewed some general tendencies perhaps I may say a few words in regard to special achievements.

A MARVELLOUS TELESCOPE.

I recently had an opportunity of examining what is certainly a most outstanding piece of light-using apparatus—the 201-inch telescope mirror now being finished, certainly the most powerful astronomical instrument in the world and of our times. The 17-ft. reflector is to be ground to but 4-in. concavity, and yet the curvature is maintained with an accuracy of one ten millionth of one inch. The thickness of the coating of "silver" is of the order of 1/20th of a wave-length of light—almost superhuman refinement! It is freely predicted that by the aid of this telescope it will be possible literally to determine the limit of the universe as we can know it; that is, to distinguish all stars that can ever be visible to us! The telescope may reveal stars at a distance equivalent to so many million light years, that the period of time taken by the light of such stars to reach the earth will be as great as a probable duration of the life of mankind on the earth. Perhaps the light from any new stars appearing at that distance could not reach this earth in time for it to be visible to the eyes of man. We may live to solve the mystery of our apparently exploding universe! This is illuminating engineering filled with romance!

UNDERWATER LIGHTING.

Turning from the heights to the depths, I have been asked to say something in regard to underwater lighting. We have developed special lamps suitable for burning under water, with an exceptionally strong bulb and with the base and wiring wrapped in soft rubber, which is highly compressed by the pressure of the water in which they are used. Such lamps may be used alike for rescue work or for scientific research. They enable one to see at a depth of some 400 feet quite well, or as far as a diver dare venture, and many underwater photographs have been obtained by their aid. Apparatus of this kind has naturally been applied for salvage operations and exploring sunken wrecks, a pastime which has become increasingly popular of late owing to the widespread conviction that sunken wrecks invariably contain hordes of gold! Underwater units have also been extensively used for the lighting of swimming baths, where they enable the figures of swimmers to be clearly revealed. This is illuminating engineering that is refreshing!

NEW FORMS OF LAMPS.

Let me next turn to some of the latest types of electric incandescent lamps, specimens of which are shown on the table. Amongst these I may mention the concentration of a 250-watt filament within an exceptionally small internally frosted bulb. This enables the lamp to be fitted with a very shallow reflector, which is much more efficient than the larger and deeper reflector used with the portable indirect floor lamp or pedestal. A companion lamp has two filaments, for high and low intensities.

Figure 1. The Bulb and Base of a Laboratory Model of a 100,000 watt Incandescent Electric Lamp. The bulb, being 55 inches long, permits a person to be enclosed within.

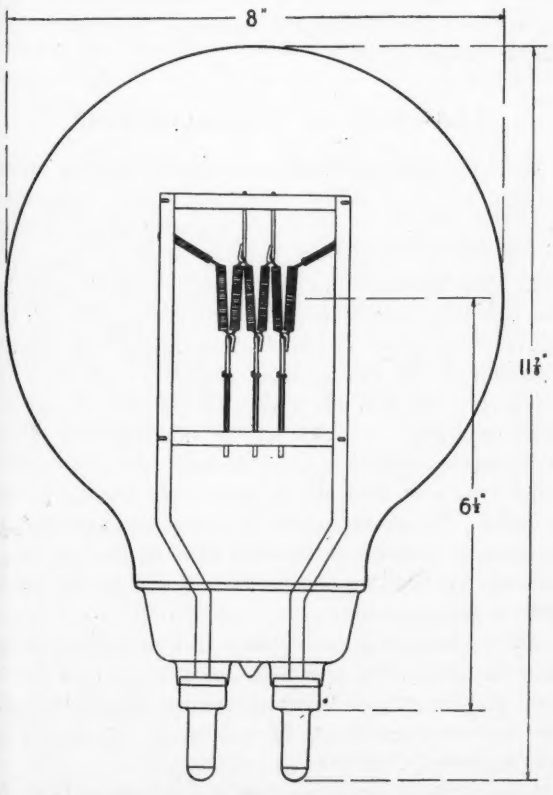


Figure 2. Dimensional sketch of 5 kw 115 volt "Bipost" Base Airport Floodlight Lamp.

We, in common with your engineers, have been developing various types of lamps for photographic work. Amongst these there are nominally 60-watt lamps run at such an efficiency as to give as much light as a 1,000-watt lamp. The life is naturally short, only one to two hours, but they serve well for photographic work. You are also familiar, no doubt, with the photoflash lamp, which gives but an instantaneous flash. We have experimented in the practice of enclosing the foil within a bulb of special blue coloured glass, which is relatively transparent to actinic light, but almost opaque to photographically useless visible rays. The blinding effect of the flash is thus reduced to something negligible, but the photographic effect is scarcely impaired.

Much attention has been devoted to improving lamps of the larger sizes. It is now usual to adopt a robust cylindrical bulb for lamps of 1,500 watts and over, the filament supports of which are brought straight out to two copper rods or thimbles, which plug into their connections. This is the "bi-post" development. Lamps up to 10 kilowatts are used in practice, and 50-kilowatt tungsten filament lamps have been operated. The working model of a 100-kilowatt lamp is being studied.

For projection work we have had good success with a special form of grid design with filaments staggered one behind the other. This permits the

use of twice the amount of incandescent metal at the focal point, and twice the wattage in the same size of bulb. Small automobile lamps have also been made on somewhat the same principle, and a new feature of such lamps is the soldering of the ring by which the base of the lamp is firmly affixed to the reflector. The lamp is thus "pre-focussed"—that is to say, the position of the filament in regard to the reflector is definitely and permanently fixed, not dependent on the pins that heretofore engaged none too accurately in bayonet slots in sockets. Owing to the greater accuracy obtained it has been possible to devise reflectors only 5 inches or less in diameter, which yet furnish the same beam-candlepower as was formerly obtained with much larger units. Our preference seems to be for the asymmetric driving and passing beam, and for clear rather than coloured bulbs.

Another novelty amongst standard lamps is one which has no cement binding in the cap, rather a mechanical gripping of brass to glass. A few lamp sizes utilise three separate base contacts and a divided filament. It is thus possible to get three distinct candlepowers from the same lamp, corresponding to the use of 150-watt or 200-watt filaments, or both combined (350 watts).

In connection with tubular sources of light, I have been impressed by the novelty of methods in use in your country and the substantial progress made in this field. All about London one sees this method of lighting in profusion. I have here one of our latest tubular lamps (30-watt), which consists of a glass tube sealed off at the ends with shallow metal discs so that the lamps can readily be mounted end to end, with negligible intervening space.

ELECTRIC DISCHARGE LAMPS.

In the field of electric discharge lamps I realise that there has been remarkable progress in Europe. We have been engaged in the perfecting of sodium lamps in four or five ratings and also with high intensity mercury lamps generally resembling those becoming popular in England. At present it seems likely that the mercury lamp will prove the more popular of the two types for interior lighting, and in the very large ratings. I believe the answers to questions of temperature, starting time and voltage, colour, and burning position will be soon found; then these new sources will supplement filament lamps and give great impetus to wider variety in illuminating engineering practice.

Before leaving the subject of lamps I would like to refer to one other matter which materially influences our practice; the question of standard maintained electrical pressure. In all countries much variation still exists. In the United States we are now concentrating on two voltages, 115 (45.2%) and 12 volts (47.6%), which answers admirably in enabling standardisation to be approached, and varieties of rating reduced. Regardless of the published voltage in any community, there is almost always an appreciable voltage drop before the lamp socket is reached, so that the voltage there is likely to prove from three to ten volts less than that for which the lamp is really intended. Consequent losses of light to the user, and in sales of power and lamps, is serious. Heavier copper for wiring on customer's premises is an answer, and we regard a change from past laxities as imperative.

Figure 3. The Statue of Liberty in New York Harbour, floodlighted at night.

EXAMPLES OF FLOODLIGHTING.

Random illustrations by slides may prove entertaining and instructive, depicting a few characteristic installations. Well known among monuments is the 275-foot Statue of Liberty in New York harbour, the floodlighting of which is remarkable for the fact that over 30 foot-candles is provided on the figure, by a somewhat special method involving the combination of two sets of projectors directed respectively up and down the length of the figure. Another interesting example of floodlighting is the Washington monument, a 550-foot pinnacle which required a very long throw and rather narrow beams of light. The problem was to obtain an approximate uniform brightness on the four faces of this pinnacle, effected by training the projectors not on the faces, but on the four edges.

The lighting of golf courses is unique, and from the players viewpoint, practical. A few courses in the United States have been lighted by filament lamps, the consumption being of the order of 5-10 kilowatts per hole.

Other pleasing examples of floodlighting are afforded by the pictures of both steam and sailing craft which are floodlighted for both beauty and

safety, the projectors being mounted on the deck so as to illuminate the canvas or the funnels above.

In the United States as in England, efforts are made to sell floodlighting equipment by means of salesmen working on patrol wagons. The lorry carries quite a wide range of projectors and lamps, any of which can be lighted up by means of a small petrol-driven electric set mounted on the car. Other slides show a diver and his equipment for underwater work; a typical shop in which the silhouette sign supplements powerful window lighting and other shops in which the modern use of concealed sources, and the built-in or architectural tendencies are evident. In connection with shop lighting it might be mentioned that the use of supplementary artificial lighting in show windows during the day time is also being encouraged, to counteract reflections of street objects, with an illumination at least *double* that usual at night. Automatic photo-cell control, for offices and shop windows, is growing. Large electric roof-signs are using this control.

The next slides show a series of views of garden lighting. Amongst interesting devices may be mentioned the mushroom-like fittings, and the flower and bird figures which illuminate the lawn and themselves form quaint decorative objects. Unusual is the illumination of a statue in the centre of a pool, by means of projectors mounted under the surface of the water.

Another series of slides executed in colour shows the wonderful lighting effects obtained in certain caves in Virginia, and in Bermuda. All the stalactites and strange rock formations are visible in their curious variety of colour, and throughout these caves all the lighting is concealed. Not a single bulb can be seen.

LIGHT AND HORTICULTURE.

Another special field of work in which much interest continues in the United States is the use of artificial light for encouraging the growth of plants Irradiation of seeds and seedlings; the growth of aquaria plants; the home use of flower pots clustered beneath the reading lamp, or even plants growing within the glass bottles that form bases of table lamps, all make interesting studies.

We have also been studying in some detail the distribution of reflection (throughout the spectrum) of various types of flowers and foliage. This distribution is shown for typical plants such as cosmos blooms, roses and lilies, and it is particularly vividly exhibited in the diagrams relating to the maple and similar leaves which, as is well known, change colour most remarkably in the autumn. In the slide the remarkable change between September 28 and October 13, when the the colour changes from green to a vivid scarlet is clearly revealed. It is thought that such graphs might be of considerable use to the artist interested in the painting of flowers who should choose a pigment giving the same spectral

Figure 4. Underwater Units applied to illuminate a small fountain.

reflection as the object serving for the model, in order to be sure of securing a faithful reproduction of the natural colour. Plant growth under monochromatic colours from vapour lamps is being studied.

SOURCES OF ULTRA-VIOLET ENERGY.

Ultra-violet light has been applied for various special purposes, exclusive of direct body radiation, such as in sterilisation of foods and in exciting fluorescence for various theatrical and decorative effects. The usage of the invisible light emitted by the special "black light" lamps (emitting energy at about 3,650 Angstroms) is shown in the appearance of this impregnated fabric. A pattern inconspicuous by visible light becomes very strikingly evident under invisible ultra-violet rays. This usage is being considered for home lighting of the near future.

One of the chief uses of ultra-violet energy, however, seems destined for purification of liquids, and for the control of moulds and deleterious growths. For this purpose we use, to a great extent, the two and five ampere mercury glow lamp which is rich in short wave energy. The 2,537 A. line in the mercury spectrum and perhaps some shorter wavelengths are particularly powerful in this respect. We may demonstrate with a cinema film which shows

Figure 5. The floodlighting of a Sailing Vessel by means of projectors mounted on the deck.

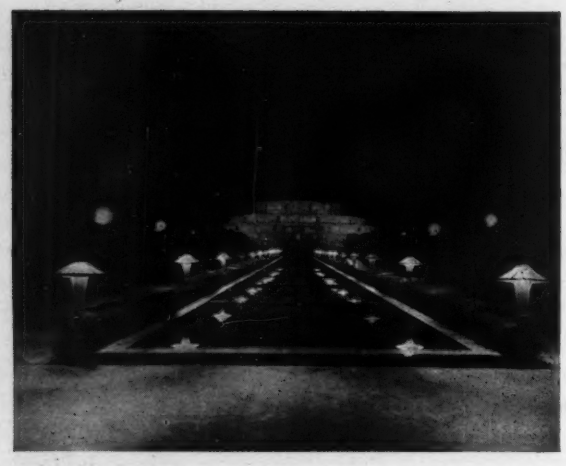


Figure 6. A Vista of Mammoth Mushroom Lighting Units (Chicago World's Fair).

how such light can be applied to purify water in which many varieties of bacteria may exist. (The film which was then run showed a magnified view of a drop of water in which the paramaecium bacteria could be seen darting rapidly about. When the ultra-violet rays were applied, the first effect was to make the bacteria more lively, but their motion subsequently became slower. Finally, they became almost stationary, with odd jerky movements, indicating extinction of life, after which their decomposition was rapid.)

DECORATIVE LIGHTING AT THE WORLD'S FAIR.

I call attention finally to a series of slides illustrating the decorative lighting at the World's Fair at Chicago. First, some day-views, then others in succession to reveal the effective use of floodlighting and outlining with coloured lights on the extensive coloured surfaces of buildings. (Incidentally, it was found a better plan to illuminate a highly-coloured surface with light of a similar tint rather than to illuminate a white surface with distinctive deeply coloured light.) Many striking contrasts of colour were produced in this way. On certain buildings long lengths of luminous tubes—over eight miles of it in all—were used. In one case, the Electrical Building, the tubes giving a deep blue light were assembled to create the impression of a waterfall. A particularly striking effect was produced by the use of tubes in recesses cut into the surface of certain buildings, and by colour-silhouette. For the lighting of interiors of buildings an illumination of the order of ten to fifteen foot-candles was mostly adopted, and altogether more than 250,000 filament lamps burn fourteen hours daily. The buildings practically have no windows, but the visitor is unaware of the absence of daylight.

Much ingenuity was shown in the design of special forms of lighting fittings used in the gardens. Units resembling giant mushrooms, and distributing the light below the eye-level, were widely used. Many forms of special pylons bearing clusters of tubular lamps arranged in horizontal series were adopted. In other cases columns using lamps concealed in a series of cones, and in yet other cases indirect fittings resembling gigantic umbrellas were adopted. Throughout the exhibition colour lighting was used in great profusion, in some cases being changed periodically, and many striking colour harmonies were achieved.

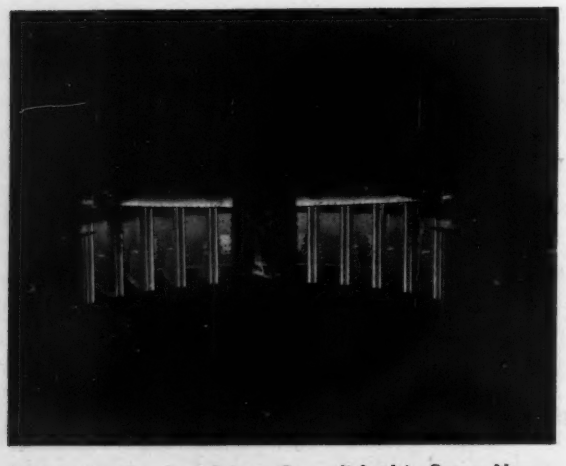


Figure 8. Facade of Science Group, lighted in Orange Neon and Lavender Colours (Chicago World's Fair).

Figure 7. Gold and Blue Pylons of the Federal Group silhouetted in an impressive manner (Chicago World's Fair).

CONCLUSION.

In conclusion I wish to emphasise once more the necessity for united efforts on the part of lighting engineers on both sides of the Atlantic. Our tasks appear in an endless vista ahead, and there is joy in the doing! We are all engaged in a common profession, surely one of the most beneficial to mankind, and I hope that our efforts will be continuously directed towards the realisation of the greatest aims with which each of our societies are associated.

Literature on Lighting

(Abstracts of Recent articles on Illumination and Photometry in the Technical Press)

(Continued from page 253, August, 1934)

I. RADIATION AND GENERAL PHYSICS.

208. Spectral Distribution of Radiation from High and Low Intensity Mercury Arcs.
B. T. Barnes. J. Opt. Soc. Amer., 24, pp. 147-148, *June*, 1934.

The measurements were carried out on Uviarc and Cooper Hewit tubes. The intensities are given of all the ultra-violet, visible and infra-red lines easily measurable with a single spectro-radiometric outfit. F. J. C. B.

209. Rayleigh's Law of Scattering in the Infra-red.
J. Opt. Soc. Amer., 24, pp. 149-154, *June*, 1934.

The scattering is inferred from transmission measurements carried out on transparent particles of zinc oxide and other finely divided crystals. The conclusion drawn by the author is that Rayleigh's law is obeyed for the smallest particles of about 0.088μ diameter but not for larger particles. F. J. C. B.

210. Light Wave as Unit of Length. Anon.
El. Times, 86, p. 91, *July* 19, 1934.

A short article on the work done at the National Physical Laboratory, to fix the Standard Yard in terms of the number of waves of cadmium red light contained in it. W. R. S.

II.—PHOTOMETRY.

211. Establishment of a Standard of Light. Director of U.S. Bureau of Standards.
Frank. Inst., J., 217, p. 105, *January*, 1934.

A note of the resolution adopted by the International Conference on Weights and Measures concerning the adoption of a black-body radiator as the fundamental standard of light. S. S. B.

212. Photometry of Coloured Light Sources. G. T. Winch, E. H. Palmer, C. F. Machin, and B. P. Dudding.
G.E.C. Journal V., pp. 125-134, *August*, 1934.

The authors discuss in detail the conditions governing the accuracy of commercial photometric measurements of discharge lamps in terms of the International Unit of candle power, which is maintained in incandescent lamps. Unless care is taken extremely large errors may arise. C. A. M.

213. The Technique of Colour Measurement.
M. Richter. Das Licht, p. 101, *June*, 1934, *and* p. 125, *July*, 1934.

A short systematic treatment of the technique of colour measurement is given, and three methods are described. These methods are (1) Direct comparison with a range of standard colours, (2) The spectral process depending on intensity measurements throughout the spectrum and leading to the trichromatic system as adopted by the I.C.I., and (3) The brightness or luminosity method using selected colour filters. The last method lends itself to the use of photoelectric cells for the purpose of measurement. S. E.

214. Spectrophotometric Determination of Tone Intensification in Colour Motion Picture Film. Alan M. Gundelfinger.
Frank. Inst., J., 217, pp. 505-515, *April*, 1934.

A spectrophotometric method of determining total visual transmission and visual density of non-neutral light filters is described. This method is used in determining density and gamma intensification produced by tones in colour motion picture work, and the importance of intensification control is emphasised. S. S. B.

215. A New Skymeter. A. S. E. Ackermann.
Nature 134, p. 209, *August* 11, 1934.

This is an instrument for measuring the proportion of the sky visible from the windows of town houses. Its use involves neither photographic nor photometric work. It consists of a pane of clear glass attached to two adjustable radius bars, the whole mounted on a stand. This is set up to face the window in question with the centre of the glass at the middle of the sky area. The sine of the elevation is read and the sky area traced on the glass, the observer using a pinhole eye-piece. This diagram is transferred to tracing paper and the sky area measured with a planimeter. This area multiplied by the sine of the elevation angle and divided by a constant gives the sill ratio. The instrument is portable and weighs less than 9 lb. T. H. H.

216. A Study of the Errors in the Photographic Method of Comparing Light Intensities. J. Tracy.
J. Opt. Soc. Amer., 24, pp. 149-154, *June*, 1934.

The main objections and difficulties associated with the photographic method are briefly discussed and methods are suggested for their control and correction. F. J. C. B.

III.—SOURCES OF LIGHT.

217. "Double Life" Lamp. Anon.
Elect. 113, p. 135, *July* 27, 1934.

A brief description is given with a photograph of a new two-filament lamp, one filament being intended to replace the other when burnt out. C. A. M.

218. Low Voltage Discharge Lamps. Anon.
Elect., 113, pp. 149-150, *August* 3, 1934.

A description is given of recent improvements effected by M. André Claude in the manufacture of low voltage discharge lamps. C. A. M.

219. High-Pressure Lamps Introduced at Chicago. Anon.
El. World, 103, p. 932, *June* 23, 1934.

A short description of the high-pressure mercury vapour lamp of the Westinghouse Lamp Company. Two of these lamps (of 400 watts rating) are used with one tungsten filament lamp (of 500 watts rating) to give approximate daylight illumination. S. S. B.

220. Mercury Vapour Lamps and their application. H. Krefft and E. Summerer.
Das Licht, p. 105, *June*, 1934.

The application of mercury discharge lamps to the following problems is discussed: Streets and open spaces, parks and gardens, offices, shop windows, stage, etc. For office lighting, etc., fittings (both direct and indirect) carrying mercury vapour and ordinary filament lamps for the production of "mixed" light are described. S. E.

221. Mercury 110-volt Lamps. Anon.
Electronics, 7 p. 199, *June*, 1934.

A note on the production of a series of 110-volt high-pressure mercury vapour lamps, in a range of wattages from 10 to 400. Dimensions and initial efficiences of some are given. S. S. B.

IV.—LIGHTING EQUIPMENT.

222. Insulations. Part XVI. H. Warren.
Elect., 113, pp. 180-181, *August* 10, 1934.

In a general survey of glass manufacture, particular reference is made to the problems associated with the glass manufactured for both gasfilled lamps and sodium and mercury vapour discharge lamps. C. A. M.

223. Some remarks on the use of automobile headlights employing yellow light. A. Blondel.
C. R., 13, pp. 1198-1200, *March* 26, 1934.

Discusses the reasons for the improvement claimed for yellow coloured headlight beams in reducing glare effects. Modern coloured glass cuts out all rays shorter than about 0.52μ, and thus reduces much of the light scattered by small water particles. Other advantages are the production of sharper images on the retina, since the light is nearly monochromatic; and a reduction of ocular fatigue. Coloured spectacles or a coloured windscreen are not equivalent to a coloured headlight beam, since the former reduce not only the intensity of the beam but also that of the whole visual field. L. J. C.

224. A Lamp with a coloured bulb for Automobile Headlights. A. Monnier and M. Mouton.
Soc. Franc. Elect.; Bull, 37, pp. 93-105, *Jan.*, 1934.

In the first part of the paper the authors discuss the advantages claimed for a coloured headlight beam,

mainly a reduction of glare effects and a greater power of penetrating fog. The remainder of the paper is devoted to the particular advantages claimed for a lamp with a coloured glass bulb. It is stated that a higher luminous efficiency is obtained with this arrangement than with a normal headlight equipped with a coloured glass window. L. J. C.

225. Something New in Metallic Mirrors. Anon.

Frank. Inst., J., 217, p. 708, *June*, 1934.

A description is given of a metallic reflecting surface formed by the evaporation of a sheet of alluminium alloy and its condensation on a sheet of glass by the use of high temperature at very low pressure. The reflection factor is given as 93 per cent. for all colours of light, and by special heat treatment may be rendered very durable without appreciable loss. S. S. B.

226. The Properties and Uses of Anodically Treated Aluminium. S. Weineck.

El. Times, 86, pp. 71-72, *July* 19, 1934.

The article deals with the formation of the wide film on aluminium from both theatrical and practical points of view. Various properties are described, including that of reflection to light which, it is claimed, is high, and, therefore, is of considerable importance. W. R. S.

227. Holders for Three-light "Mazda" Lamps. Anon.

El. World, 103, p. 967, *June* 30, 1934.

Control is obtained in the single units by a special 6 amp. 110 volt canopy switch, and in multiple units by a conveniently wired wall-type switch. Cord sets have rubber plugs moulded on the cords. S. S. B.

V.—APPLICATIONS OF LIGHT.

228. Seeing by Coloured Light. L. Schnieder.

Das Licht, July, 1934.

A discussion of this question prompted by the use of mercury and sodium discharge lamps. The work of Arndt, Arndt and Dresler, Klein, and Luckeish and Moss is received and the general conclusion is reached, that where colour perception is of no importance, monochromatic light is rather better for "form" recognition than ordinary light. S. E.

229. Glare in Yellow Light. Y. Le Grand.

C. R., 11, pp. 1075-1077, *March* 12, 1934.

Describes measurements made of the contrast sensitivity of the eye, defined as the ratio of the test field brightness to the smallest perceptible increase in that brightness. Measurements were first made using light of the colour encountered in normal motor car headlight lamps. The presence of a glare source, 5 degrees to one side of the test field, was found to decrease the contrast sensitivity over a field brightness range from 10^{-6} to 10^{-2} candles per square cm. There was some improvement when a selective yellow filter was inserted in front of the glare source. When, however, the filter was placed in front of the observer's eye the sensitivity was found to be everywhere the same as that obtained with the filter absent. It is concluded, therefore, that the use of yellow screens or spectacles by observers of cars offers no advantage in reducing glare effects. L. J. C.

230. Illumination for the Examination of Art Paper. P. Grundfest.

Das Licht, p. 121, *July*, 1934.

Tests were made with various lamps in a trial fitting till four 60w. lamps giving 1,000 lux on the testing table was reached and found to be quite satisfactory—but not quite so good as daylight. Further raising the illumination showed no marked improvement in results. Further tests with daylight lamps giving 150 to 200 lux on the working plane were found to be more satisfactory than ordinary lamps. S. E.

231. Land, Aerodrome and Airway Lighting.

British Standard, Specification, No. 563, 1934.

The specification consists of three portions, parts (I.) Land Aerodrome Lighting, (II.) Airway Lighting, and (III.) Lighting for Air Navigation. In (I.) conditions relating to aerodrome beacons, boundary lights, obstruction lights. wind-indicators, etc., are specified. (II.) and (III.) deals respectively with beacons and obstruction lights for airways and in navigation. Appendices deal with aviation colours (red, orange, and green), and the spacing of airway beacons. J. S. D.

232. Street Lighting Experiments. M. Cohu.

B.I.P., VII., pp. 129-131, *Aug.-Sept.*, 1934.

At Vincennes, in the vicinity of Paris, a "road week" for the purpose of making experiments in street lighting on a selected length of roadway has been arranged. Five different methods of lighting, based on the use of mercury and sodium vapour lamps are being utilised. A new form of 3-phase sodium vapour lamp is illustrated. J. S. D.

233. G.E. to Test Lighting with 240 feet Model Road. Anon.

El. World, 104, p. 27, *July* 7, 1934.

A description is given of a model street, to a scale of one-eighth full size, built by the General Electric Company, Cleveland, on which the relative seeing-values of sodium vapour, high pressure mercury vapour, and tungsten filament lamps are to be compared, for a given expenditure, and the methods of application to the best advantage are to be investigated. S. S. B.

234. The Mersey Tunnel. Anon.

El. Times, 86, p. 73, *July* 19, 1934.
El. Times, 86, p. 127, *July* 26, 1934.

An account of the Mersey tunnel, including photographs of the lighting, with descriptions, both inside and on the approaches, including the very elaborate mercury discharge and tungsten filament mixture fittings on the approaches. W. R. S.

235. New West Ham Baths. Anon.

El. Times, 86, p. 122, *July* 26, 1934.

Particular attention has been paid to the lighting of these baths, which were opened quite recently. The major pool is lit by laylights, the glass area being so large and uniformly bright that the impression of daylight is said to be created. Various other interesting fittings are installed. W. R. S.

236. Sports Lighting. M. W. Peirce.

G.E.C. Journal, V., pp. 175-186, *August*, 1934.

Problems covering the lighting of fields and arenas for many types of sports are discussed in detail. Numerous photographs are given. C. A. M.

237. Reliability, Accessibility in Bridge Lighting. Francis A. Westbrook.

El. World, 104, pp. 44-46, *July* 14, 1934.

The problems presented in providing the necessary circuits for lights for traffic, aviation, and navigation requirements on the George Washington Bridge, New York, and the means of dealing with them are given in this article. S. S. B.

238. Two-Filament Lamps in New Department Store. L. C. Twichell.

El. World, 103, p. 938, *June* 30, 1934.

A description is given of an installation in a Rochester (U.S.A.) stores of a system of indirect lighting, utilising two-filament lamps. The initial measured average illumination was 38 foot-candles. S. S. B.

239. Light-beam Fence Protects High-Voltage Test Workers. T. R. Watts.

El. World, 104, p. 22, *July* 7, 1934.

A beam of light falling on a photo-cell is used in the Westinghouse Research Laboratories as a protective device for work on high-voltage apparatus. The advantages of the exceptional flexibility afforded by this means, compared with the usual wire cage, are pointed out. S. S. B.

240. Decorative Lighting in Genoa.

L'Illuminazione Razionale, VII., pp. 136-137, *June-July*, 1934.

Spectacular lighting at a bathing place near Genoa is described. A striking effect is obtained by arranging for a neon tube to follow a spiral water pipe, from which water is emitted through small holes. The onlooker thus sees a luminous spiral, with illuminated spray, emerging from it. J. S. D.

241. Festival and Spectacular Lighting.

The Australian Engineer, 34, pp. 16-19, *June* 7, 1934.

A series of papers read before the Illuminating Engineering Society of Australia is reproduced. Examples of public lighting and display lighting in Melbourne are discussed and illustrations of striking installations abroad are presented. Flood-lighting and illuminated fountains are also illustrated. J. S. D.

242. Gas Lighting of a Swimming Bath

Gas World, August 4, 1934.

Nottingham has recently constructed the largest inland open-air swimming pool in England. It is 330 feet long by 75 feet wide, and contains 800,000 gallons of water. The floodlighting has been carried out by the Nottingham Gas Department, the general scheme being described and illustrated in the "Gas World" for August 4, 1934. J. G. C.

Recent Patents

(Abstracts of recent Patents on Illumination & Photometry.)

No. 411868. Improvements in and Relating to the Control of Colour Lighting Apparatus.
Holophane Limited and Williams, R. G., December 14, 1932 (*Cognate Provisionals*).

This specification describes apparatus for the control of colour-lighting systems, comprising a plurality of associated sets of equipment used simultaneously, and controlled by motor-driven dimmers with rotary drum-switch control, each set being provided with its own drum switch.

No. 411957. Improvements in Holders for Electric Incandescent Lamps.
Grote, E.R., January 17, 1933.

This specification covers a lamp holder arrangement for a tubular lamp with an axial filament and laterally protruding terminals near opposite ends. The terminals of the lamp are held against or between longitudinal resilient conductors which permit longitudinal movement of the lamp. The terminals of the lamp are grooved, and bear against the conductors. The continuous conductors may make contact with several lamps.

No. 412031. Improvements in or Relating to Luminous Electric Discharge Tubes.
The General Electric Co., Limited, and Ryde, J. W., May 22, 1933.

This specification describes a lamp of the high pressure metal vapour type, wherein an auxiliary electrode comprises a wire sealed through the wall of the lamp, and surrounded by a glass sheath extending from the wall to near the end of the auxiliary electrode, which is in the neighbourhood of the main electrode (a filament adapted to be heated by current), but not touching the end.

No. 412053. Improvements in Suspended Lamps for Shop Lighting and Like Purposes.
Holophane Limited, February 9, 1933 (*Convention U.S.A.*).

This specification relates to a shop-lighting fitting having a multiple part envelope divided upon an inclined median plane, that part above the division comprising a reflector, the light source being disposed in the lower part, which is hemispherical or partly so, with an optical axis substantially normal to the plane of division, and is of translucent material. The fitting produces a downward flood of light of controlled spread and uncontrolled light of comparatively low intensity through a wider angle.

No. 412117. Improvements in Light Filters for Use with Light Sensitive Cells.
Dresler, A., December 4, 1933.

According to this specification, a composite filter, consisting of several filter elements of different properties placed side by side, is placed over a photoelectrical cell for spectral compensation.

No. 412202. Improvements in or Relating to Lamps for Motor Vehicles, more particularly Projecting Lamps for Motor Cars, Motor Cycles, and Similar Vehicles.
Rall, O., December 20, 1932.

This specification describes a headlamp for projecting two narrow intense beams which fall upon the road and define the track width of the vehicle.

No. 412356. Improvements in Electric Discharge Lamps.
The General Electric Company Limited, March 24, 1932 (*Convention Germany*).

This specification covers a lamp having an anode which is electronically bombarded to raise its colour light temperature to above 2000° K.

No. 412665. Improvements in and Relating to Light Sensitive Devices.
British Thomson-Houston Company, Limited, Ruff, H. R., and Scott, W. J., February 2, 1933.

This specification describes a photo-sensitive cell, particularly of the semi-conductor type employing selenium or thallium sulphide, in which two or more separate wires or strips of metal, to form electrodes are sealed into glass so that the metal is partly embedded in the glass and partly projects. The layer of photo-sensitive material may be deposited over the glass and electrodes thus formed.

No. 412841. Gas-Filled Incandescent Electric Lamps with a Tubular Bulb.
Vereinigte Glühlampen und Electricitäts Aktiengesellschaft, November 18, 1932 (*Convention Austria*).

Tubular lamps, such as projection lamps, are filled with gas at a pressure of two or more atmospheres. Special proportions for the lamp envelope to withstand the internal pressure are given. The envelope may be reinforced with protective netting. The high gas pressure prevents deposition of volatilized tungsten opposite the filament, this being carried to the end of the tube.

No. 412943. Improvements in Automatic Gas Lighting and Extinguishing Apparatus.
Horstmann, F. O., Horstmann, J. H. G., and The Horstmann Gear Company, Limited, January 4, 1933.

This specification describes an automatic gas lighter operated by clockwork in which the valve is opened in two stages, the first admitting gas to the main and a pilot burner and the second shutting off the pilot burner, which has an igniter associated with it. The valve, however, closes in one stage.

No. 413453. Improvements in or Relating to Light-Distributing Fittings.
The General Electric Company, Limited, Beggs, S. S., and Stoyle, A. R., April 11, 1933.

This specification describes a diffusing fitting in which a linear light source is surrounded by a series of conical sheets, co-axial and with diffusely reflecting surfaces. The whole may be enclosed and may be combined with another directive fitting.

No. 413562. Improvements in and Relating to Indicators for Showing Failure of Electric Lamps.
The British Thomson-Houston Company, Limited., December 9, 1932 (*Convention U.S.A.*)

This case describes a lamp-failure indicator comprising a glow lamp in series with a resistance incorporated in an annular member which may embrace the neck or socket of a lamp. The resistance and glow lamp are shunted across the lamp and the glow lamp lights up upon failure of the lamp.

Street Lighting Control That "Looks After Itself"

"On" at Dusk—"Off" at Dawn; Without Maintenance or Renewal

In principle the control of the artificial lighting of streets should be such as to take effect immediately daylight falls to a value rendering artificial lighting necessary—a limit which varies greatly with the season of the year, and from day to day, according to climatic conditions.

Hence the interest now being taken in light-sensitive control, in which Radiovisor Parent, Ltd., are specialists. Many miles of public lighting are already controlled by this method, which has also been specially adapted to the control of light at traffic islands, traffic circuses, direction signs, etc.

Such apparatus ordinarily includes in its circuit a thermionic valve—an expendable part, naturally requiring renewal in course of time. Radiovisor Parent, Ltd., however, are now introducing improved apparatus having an indefinite life and calling for no maintenance or replacements of any kind. Apart from the electro-magnetically operated switch (which normally acts twice in the twenty-four hours, to bring the lights "on" and to switch them "off") there are no moving parts. The apparatus has a negligible consumption of current (either d.c. or a.c.), is exceedingly simple in operation, and requires no attention. It will effect a great saving in the burning hours of lamps.

The improved unit consists of two fundamental sections: (1) the Radiovisor Selenium Bridge, which observes and responds to varying intensity of daylight; and (2) the electro-magnetic mechanism which operates the switch. Diminishing daylight reduces the value of the small current flowing between the electrodes of the bridge; conversely increased intensity of daylight gives rise to a greater current. The bridge is connected in series with a fixed resistance, the P.D. across which thus varies proportionally with the current. A condenser, connected across this resistance, acquires a charge proportional to this P.D. Hence, at a certain time of day—say, at dawn—a definite potential or "striking voltage" will be attained across the condenser, which will then discharge through a gas discharge tube fitted across it and in series with the winding of the electro-magnetically operated switch—which will then operate. Once tripped, the relay remains in its new position until a current due to subsequent operation restores it to the original one. Turning "on" at night and "off" in the morning at a given daylight intensity are automatically effected. This reversal is brought about by the use of small additional contacts on the relay itself, which acts as a single pole change-over switch.

It will be seen that the switch, instead of having to deal with a slowly changing current, is now actuated decisively by a sudden and momentary current-rush, so that the contacts are working under the best conditions.

This new form of unit which will, it is believed, relegate valve and transformer units to the past, will be demonstrated at the exhibition arranged in connection with the 11th Annual Conference of the Association of Public Lighting Engineers in Aberdeen during September 17-20. It may also be seen at the offices of Radiovisor Parent, Ltd. (28, Little Russell-street, London, W.C.1).

Dock Lighting at Singapore

The importance of good lighting of docks, which formed the subject of a recent paper issued by the Department of Scientific and Industrial Research, is well illustrated at Singapore, a port which occupies an important strategic position in the Orient, and has been described as "The Cross Roads of the East."

In the Telok Ayer basin, near the centre of the inner harbour, a very efficient system of lighting has recently been installed. In many ways this resembles that adopted in the West Indian Docks controlled by the Port of London Authority. The port limits, comprising inner harbour, outer harbour, and western anchorage, cover an area of 36¼ square miles. Many vessels still discharge and load in the inner and outer harbours, necessitating a continual flow of lighters to and from the warehouses on the banks of Singapore's short and narrow river and the Telok Ayer basin. The last named has a stage totalling 3,077 ft. in length, available for landing cargo. The lighting of the landing stage and the 50-ft. wide roadway is carried out by means of 26 G.E.C. lanterns of the P.L.A. type, mounted on 30-ft. poles spaced 130 ft. apart, and housing 500-watt Osram lamps. A feature of the installation, illustrated in the accompanying photograph, is the wide lateral dispersion of the light.

The Dock side of the Telok Ayer basin at the Port of Singapore, illuminated by "Wembley" lanterns housing Osram lamps.

This efficient lighting is stated to have already contributed to a marked saving in the periods involved in the handling of vessels and the discharge of their cargoes—for many "tides" can be worked which would otherwise be impracticable. Apart from the Telok Ayer basin, the wharves, docks, and roads throughout the port of Singapore are lighted generally by Wembley lanterns, of which approximately two hundred, equipped with 500 to 1,000-watt lamps, are in service.

Intensive Public Lighting in Hove

The continued increase in the volume and speed of traffic, coupled with the public demand for better street lighting, has enabled the Hove authorities to initiate extensive improvements in their street lighting. An interesting feature is the way in which all classes of thoroughfares are included in this improvement, which covers over two miles of important sea front, main shopping areas, main residential areas, and the artisan section of the town.

The scheme was planned to the proposals of the Borough Engineer (Mr. T. R. Humble, A.M.Inst.C.E.), and embodies two of the latest types of Holophane Duo-Dome refractors, symmetrical and directional types, in lanterns and attachments manufactured and installed by the Brighton Lighting and Electrical Engineering Co., Ltd.

One of the most striking items is the improvement effected along the entire length of Kingsway, where the introduction of Duo-Dome refractors with 500-watt lamps, as compared with the 300-watt lamps in lanterns with clear outer globes previously used, has completely altered the effect by night. Changes in method occur throughout the district served. Thus whilst the improved lighting extends well over two miles of front (from the Portslade to the Brighton boundary), the method adopted at the Portslade end, where central standards equipped with 180° directional units, spaced 120 feet apart and 22 feet high, are used, gives place to overhead suspension when Victoria Terrace is approached; beyond which, and right along Kingsway, Hove, to the Brighton boundary, standards again come into use—now, however, mounted to the side of the main thoroughfare, and incorporated in a parapet wall.

Figure 1. Night Photograph of Victoria Terrace, Hove.

In the main thoroughfares of a residential nature the method of central suspension is practically universal. The Hove Corporation were among the first to appreciate the advantages of this method, not only in regard to efficiency, but in avoiding the obstruction caused by trees of mature growth—such as are used on both sides of the main residential roads of Hove. All the bus-routes are equipped in the same way. The units, in this case 150° directional type, are again spaced at centres of about 120 feet, and are approximately 22 feet high.

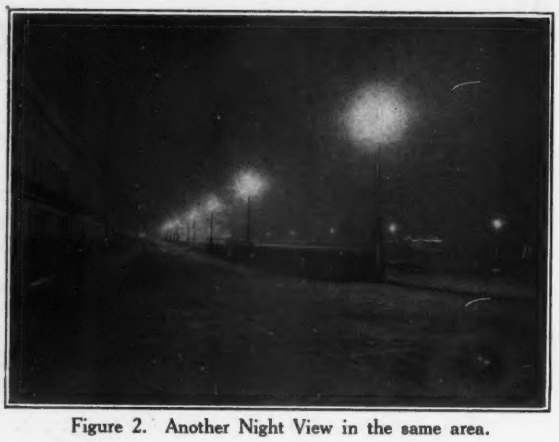
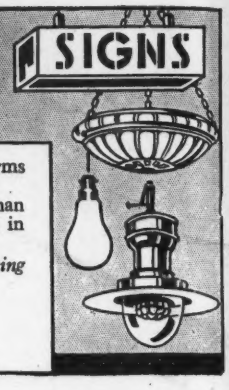


Figure 2. Another Night View in the same area.

Further data on this installation are to be found in a booklet recently issued by Holophane, Ltd., in which the Duo-Dome refractors are described, and polar curves of light-distribution are presented.

Figure 3. Another Night Photograph showing the effect of Holophane Duo-Dome (180° directional lighting) in Hove.

·WHERE TO BUY·
A DIRECTORY OF LIGHTING EQUIPMENT



We invite applications for spaces in this new section of the journal. Particulars of terms for each space (approx. 1 inch deep and 3¼ inches wide) are given below.

These terms are equivalent to **half our ordinary advertising rates,** but not less than 12 successive monthly insertions can be accepted on this basis, and amounts are payable in advance.

Payment for an advertisement in this section entitles the advertiser to receive *The Illuminating Engineer* during the period of the contract.

Terms:	**12 Successive Monthly Insertions**	**£3 10 0**	}	**Payable**
	24 " " "	**£6 0 0**	}	**in**
	36 " " "	**£8 10 0**	}	**Advance**

"The Gas Times"

Readers will learn with interest that a new journal, "The Gas Times," is to appear early next month. The new venture will have the assistance of Mr. A. C. Slaughter as editor, Mr. A. J. Dowsett as assistant editor, and Mr. E. H. Hallows as advertisement director—all of whom, until recently, occupied similar positions with the "Gas World"—and its offices are located at 121, Victoria Street, London, S.W.1.

Contracts Closed

THE BRITISH THOMSON HOUSTON CO., LTD.

H.M. Office of Works—For the supply of Mazda lamps for 12 months, commencing August, 1935.

THE GENERAL ELECTRIC CO., LTD.

H.M. Office of Works—For 12 months' supplies of Osram lamps.

Moss, Hutchinson Line—For 6 months' supplies of Robertson lamps.

SIEMENS ELECTRIC LAMPS AND SUPPLIES, LTD.

Southern Railway—For the supply of Siemens Electric lamps for the ensuing 12 months.

Post Office Stores Dept.—Extension of contract for Siemens Electric lamps over the next 8 months.

Obituary.

Professor W. C. Clinton.

As we go to Press we learn with great regret of the death of Professor Wellesley Curram Clinton, Pender Professor of electrical engineering at University College, London, which occurred on August 18.

Professor Clinton was at one time keenly interested in illumination, though in the years following the war his attention was necessarily concentrated mainly on his duties at University College. He was at one time on the Council of the Illuminating Engineering Society. He frequently contributed to discussions, and was responsible for a particularly able contribution illustrating how illumination can be accurately predetermined when lighting installations are planned. He was also a member of the two committees formed by the society during the war in order to undertake researches on the illuminating power of flares and on the decay in brightness of the luminous paint used for gunsights, etc. He was responsible for a translation of Dr. L. Bloch's book on "The Science of Illumination." An appreciative note by Dr. A. P. Thurston in "The Times" calls attention to the able way in which Professor Clinton organised the teaching work of the electrical engineering department at University College, thus enabling Professor Fleming to devote himself freely to the brilliant researches with which his name is associated. Dr. Thurston justly alludes to the extraordinary thoroughness and meticulous care with which all Professor Clinton's work was done. This quality, coupled with his high standard of absolute integrity and unselfish disposition, gained the respect of all who knew him.

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